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F.G. Summers

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TECHNICAL MEMORANDUM

SCIENCE DIRECTORATE PUBLICATIONS AND PRESENTATIONS JANUARY 1–DECEMBER 31, 2003

NASA REPORTS AND OTHER PUBLICATIONS

Technical Memorandums

1. An Experimental Investigation To Determine Interaction Between Rotating Bodies, *NASA/TM–2003–212286*, February 2003. R.N. Grugel, K. Mazuruk, and M.P. Volz.
2. Science Directorate Publications and Presentations, January 1–December 31, 2002, *NASA/TM–2003–212635*, December 2003. Compiled by F.G. Summers.

Technical Publications

1. Gauging the Nearness and Size of Cycle Maximum, *NASA/TP–2003–212927*, November 2003. R.M. Wilson and D.H. Hathaway.

Conference Publications

1. 2002 NASA Materials Science Conference—Proceedings, *NASA/CP–2003–212339*, CD-ROM, 2003. N. Ramachandran.
2. 2002 NASA Materials Science Conference—Proceedings, *NASA/CP–2003–212339*, Abstract Book, D. McCauley and N. Bennett (eds.), 2003. D. Gillies, N. Ramachandran, and K. Murphy.
3. Flight Planning for the *International Space Station*—Levitation Observation of Dendrite Evolution in Steel Ternary Alloy Rapid Solidification, Proceedings of 2002 NASA Materials Science Conference, Huntsville, AL, June 25–26, 2002, *NASA/CP–2003–212339*, D. Gillies, N. Ramachandran, K. Murphy, D. McCauley, and N. Bennett (eds.), pp. 221–230, 2003. M.C. Flemings, D.M. Matson, W. Loser, R.W. Hyers, and J.R. Rogers.
4. Small Particle Response to Fluid Motion Using Tethered Particles To Simulate Microgravity, Proceedings of 2002 NASA Materials Science Conference, Huntsville, AL, June 25–26, 2002, *NASA/CP–2003–212339*, D. Gillies, N. Ramachandran, K. Murphy, D. McCauley, and N. Bennett (eds.), pp. 643–654, 2003. J.D. Trolinger, R. Rangel, C. Coimbra, W.K. Witherow, J.R. Rogers, and R.B. Lal.

5. Studies of Nucleation and Growth, Specific Heat and Viscosity of Undercooled Melts of Quasicrystals and Polytetrahedral-Phase-Forming Alloys, Proceedings of 2002 NASA Materials Science Conference, Huntsville, AL, June 25–26, 2002, *NASA/CP–2003–212339*, D. Gillies, N. Ramachandran, K. Murphy, D. McCauley, and N. Bennett (eds.), pp. 327–337, 2003. K.F. Kelton, A.K. Gangopadhyay, G.W. Lee, R.W. Hyers, J.R. Rogers, M.B. Robinson, T.J. Rathz, and S. Krishnan.

Contractor Reports

1. Identification and Characterization of Extremophile Microorganisms With Significance to Astrobiology, 2002 NASA Faculty Fellowship Program Research Reports, *NASA/CR–2003–212397*, pp. 42–46, 2003. A.K. Bej.
2. Interfacial Reaction Studies Using ONIOM, For inclusion in 2002 NASA Faculty Fellowship Program Research Reports, *NASA/CR–2003–212397*, pp. 63–67, 2003. B.H. Cardelino and C.E. Moore.
3. Self-Consistent Large-Scale Magnetosphere-Ionosphere Coupling: Computational Aspects and Experiments, 2002 NASA Faculty Fellowship Program Research Reports, *NASA/CR–2003–212397*, pp. 160–164, 2003. T.S. Newman.

Undergraduate Student Research Program, 2003 Technical Report Collection

1. Analysis of Variance in Successive Succinonitrile Purity Level Measurements, 2003 USRP Summer Faculty Program, pp. 127–132, 2003. C. Hales.
2. Coupling Enhanced Lasing in Resonators, 2003 USRP Summer Faculty Program, pp. 119–126, 2003. A. Gates.
3. Coding a Pulse Height Analyzer for the GBM Prototype DPU, 2003 USRP Summer Faculty Program, pp. 201–205, 2003. D. Perrin.
4. Optimizing Crystal Growth Conditions for Delta-L: A Solubility Study of Insulin, 2003 USRP Summer Faculty Program, pp. 101–111, 2003. J.L. Baldrige.
5. Osmolality Studies To Optimize Cryoprotection in Macromolecular Crystallography, 2003 USRP Summer Faculty Program, pp. 207–212, 2003. J.L. Richards.
6. Radiation Dose Response in the Human Lymphoblast Cell Line TK6, 2003 USRP Summer Faculty Program, pp. 93–99, 2003. A. Abalos.
7. Ultra Violet Decomposition of Hydrogen Peroxide, 2003 USRP Summer Faculty Program, pp. 169–179, 2003. J. Huff.

OPEN LITERATURE

Refereed Journal Articles

1. 2001 April Burst Activation of SGR 1900+14: Pulse Properties and Torque, *Astrophys. J.*, 596, 464–469, October 10, 2003. P.M. Woods, C. Kouveliotou, E. Gogus, M.H. Finger, M. Feroci, S. Mereghetti, J.H. Swank, K. Hurley, J. Heise, D. Smith, F. Frontera, C. Guidorzi, and C. Thompson.
2. The Anisotropy of the Microwave Background to $l=3500$: Deep Field Observations With the Cosmic Background Imager, *Astrophys. J.*, 591, 540–555, July 2003. B.S. Mason, T.J. Pearson, A.C. Readhead, M.C. Shepherd, J. Sievers, P.S. Udomprasert, J.K. Cartwright, A.J. Farmer, S. Padin, S.T. Myers, J.R. Bond, C.R. Contaldi, U. Pen, S. Prunet, D. Pogosyan, J.E. Carlstrom, J. Kovac, E.M. Leitch, C. Pryke, N.W. Halverson, W.L. Holzapfel, P. Altamirano, L. Bronfman, S. Casassus, J. May, and M.K. Joy.
3. The Anisotropy of the Microwave Background to $l=3500$: Mosaic Observations With the Cosmic Background Imager, *Astrophys. J.*, 591, 556–574, July 2003. T.J. Pearson, B.S. Mason, A.C. Readhead, M.C. Shepherd, J. Sievers, P.S. Udomprasert, J.K. Cartwright, A.J. Farmer, S. Padin, S.T. Myers, J.R. Bond, C.R. Contaldi, U. Pen, S. Prunet, D. Pogosyan, J.E. Carlstrom, J. Kovac, E.M. Leitch, C. Pryke, N.W. Halverson, W.L. Holzapfel, P. Altamirano, L. Bronfman, S. Casassus, J. May, and M.K. Joy.
4. Application of Powder Diffraction Methods to the Analysis of Short- and Long-Range Atomic Order in Nanocrystalline Diamond and SiC; the Concept of the Apparent Lattice Parameter (ALP), *Solid State Phenomena*, 94, 203–216, 2003. B. Palosz, E. Grzanka, S. Gierlotka, S. Stel'makh, R. Pielaszek, U. Bismayer, H. Weber, and W. Palosz.
5. Boundary Layer Aerosol Composition Over Sierra Nevada Mountains Using 9.11- and 10.59- μm Continuous Wave Lidars and Modeled Backscatter From Size Distribution Data, *J. Geophys. Res.*, 108(D3), DOI 10.1029/2002JD002252, February 2003. D.R. Cutten, M.A. Jarzembski, V. Srivastava, R.F. Pueschel, S.D. Howard, and E.W. McCaul, Jr.
6. A Brief Analysis of Capillary Sealing Methods and Their Effectiveness, *J. Crys. Growth and Design*, 108(D3), 2003JGRD.108cACH18C, DOI 10.1021/cg025605g, February 2003. D.S. Ferree and M.J. van der Woerd.
7. Carbon Nanotubes Growth on Graphite Fibers, *J. Diamond and Related Mat.*, 12, 1825–1828, 2003. S. Zhu, C.-H. Su, S.L. Lehoczy, I. Muntele, and D. Ila.
8. Chandra Observations of Magnetic White Dwarfs and Their Theoretical Implications, *Astrophys. J.*, 593, 481–485, August 10, 2003. Z.E. Musielak, M. Noble, J.G. Porter, and D.E. Winget.

Refereed Journal Articles (Continued)

9. Chandra Observations of the Anomalous X-Ray Pulsar 4U0142+61, *Astrophys. J.*, 587, 367–372, April 10, 2003. S.K. Patel, C. Kouveliotou, P.M. Woods, A.F. Tennant, M.C. Weisskopf, M.H. Finger, C.A. Wilson, E. Gogus, M. van der Klis, and T. Belloni.
10. Chandra Observations of the Faintest Low-Mass X-Ray Binaries, *Astrophys. J.*, 596, 1220–1228, October 20, 2003. C.A. Wilson, S.K. Patel, C. Kouveliotou, P.G. Jonker, M. van der Klis, W.H. Lewin, and T. Belloni.
11. Chandra X-Ray Observations of the Spiral Galaxy M81, *Astrophys. J.*, 144(2), 213–242, February 2003. D.A. Swartz, K.K. Ghosh, M.L. McCollough, T.G. Pannuti, A.F. Tennant, and K. Wu.
12. Chandra X-Ray Observatory Observations of the Globular Cluster M28 and Its Millisecond Pulsar PSR B1821–24, *Astrophys. J.*, 594, 798–811, September 2003. W. Becker, D.A. Swartz, G.G. Pavlov, R.F. Elsner, J. Grindlay, R. Mignani, A.F. Tennant, D. Backer, and M.C. Weisskopf.
13. Chandra X-Ray Observatory: An Overview, *Adv. Space Res.*, 32, 2005–2011, 2003. M.C. Weisskopf.
14. Characterization of Corning EPMA Standard Glasses 95IRV, 95IRW, and 95IRX, *J. Res. Nat. Inst. Standards and Technology*, 107(6), 703–718, December 2002. P.K. Carpenter, D. Counce, E. Kluk, and C. Nabelek.
15. Characterization of the Timing Noise of the Crab Pulsar, *M.N.R.A.S.*, 344, 412–430, September 2003. D.M. Scott, M.H. Finger, and C.A. Wilson.
16. Charge Sharing and Charge Loss in a Cadmium-Zinc-Telluride Fine-Pixel Detector Array, *Nucl. Instru. & Methods in Phys. Res.*, 505, 122–125, June 2003. J.A. Gaskin, D.P. Sharma, and B.D. Ramsey.
17. Comparison of Redshift-Known Gamma-Ray Bursts With the Main Groups of Bright BATSE Events, *Astrophys. J.*, 584, 904–910, February 2003. I.G. Mitrofanov, A.B. Sanin, D.S. Anfimov, M.L. Litvak, M.S. Briggs, W.S. Paciesas, G.N. Pendleton, R.D. Preece, and C.A. Meegan.
18. Complex Refractive Index of Ammonium Nitrate in the 2–20- μ m Spectral Range, *Appl. Opt., Lasers, Photonics, and Environmental Opt.*, 42, 922–930, February 2003. M.A. Jarzembski, M.L. Norman, K.A. Fuller, V. Srivastava, and D.R. Cutten.
19. Composition Dependence of the Hydrostatic Pressure Coefficients of the Bandgap of $\text{ZnSe}_{1-x}\text{Te}_x$ Alloys, *Phys. Rev. B.*, 68, DOI 2003PhRvB 68c3206W, July 2003. J. Wu, W. Walukiewicz, K.M. Yu, W. Shan, J.W. Ager III, E.E. Haller, I. Miotkowski, A.K. Ramdas, and C.-H. Su.

Refereed Journal Articles (Continued)

20. Convection and Easterly Wave Structure Observed in the Eastern Pacific Warm-Pool During EPIC–2001, *J. Atmos. Sci.*, 60(15), 1754–1773, August 1, 2003. W.A. Petersen, R. Cifelli, D.J. Boccippio, S.A. Rutledge, and C.W. Fairall.
21. Correction to “Self-Consistent Magnetosphere-Ionosphere Coupling: Theoretical Studies,” *J. Geophys. Res.*, 108(A6), 1264, DOI 10.1029/2003JA009966, June 2003. G.V. Khazanov, M.W. Liemohn, T.S. Newman, M.-C. Fok, and R.W. Spiro.
22. Crystallization and Preliminary X-Ray Analysis of Der f 2, a Potent Allergen Derived From the House Dust Mite (*Dermatophagoides Farina*), *Acta Crystall. D*, D59, Part 6, 1046–1048, June 2003. D.F. Roeber, A. Achari, T. Takai, Y. Okumura, and D.L. Scott.
23. Crystallization and Preliminary X-Ray Analysis of Human Recombinant Acid β -Glucocerebrosidase, A Treatment for Gaucher’s Disease, *Acta Crystall. D*, D59, Part 2, 343–344, February 2003. D.F. Roeber, A. Achari, P. Manvalan, T. Edmonds, and D.L. Scott.
24. Design of a Ferroelectric Programmable Logic Gate Array, *Integrated Ferroelectrics*, 56, 1013–1021, 2003. T.C. MacLeod and F.D. Ho.
25. *Desulfonatronum Thiodismutans* sp. nov., A Novel Alkaliphilic, Sulfate-Reducing Bacterium Capable of Lithoautotrophic Growth, *Int. J. Systematic and Evolutionary Microbiology*, 53, 1327–1332, DOI 10.1099/js0.02598–0, January 24, 2003. E.V. Pikuta, R.B. Hoover, A.K. Bej, D. Marsic, W.B. Whitman, D. Cleland, and P. Krader.
26. Double Layers in Expanding Plasmas and Their Relevance to the Auroral Plasma Processes, *J. Space Phys.: Special Issue on What Causes the Aurora*, 108(A4), DOI 10.1029/2002JA009436, 2003. N. Singh and G.V. Khazanov.
27. The Effect of the Wall Contact and Post-Growth Cool-Down on Defects in CdTe Crystals Grown by “Contactless” Physical Vapor Transport, *J. Phys. D*, 254, 316–328, 2003. W. Palosz, K. Grasza, K. Durose, D. Halliday, N. Boyall, M. Dudley, B. Raghothamachar, and L. Cai.
28. Effects of Uncertainty in TRMM Precipitation Radar Path Integrated Attenuation on Interannual Variations of Tropical Oceanic Rainfall, *Geophys. Res. Lett.*, 30, 29–1, Cite ID 1180, DOI 10.1029/2002GL016416, February 2003. F.R. Robertson, D.E. Fitzjarrald, and C. Kummerow.
29. Evidence for Spiral Magnetic Structures at the Magnetopause: A Case for Multiple Reconnections, *Adv. Space Res.*, 32(10), 1989–1999, 2003. O.L. Vaisberg, V.N. Smirnov, L.A. Avakov, and T.E. Moore.
30. Evidence That a Deep Meridional Flow Sets the Sunspot Cycle Period, *Astrophys. J.*, 589, 665–670, May 20, 2003. D.H. Hathaway, D. Nandy, R.M. Wilson, and E.J. Reichmann.

Refereed Journal Articles (Continued)

31. Evolution of the Polarization of the Gamma Ray Burst GRB 030329, *Nature*, 426, 157–159, November 2003. J. Greiner, S. Klose, K. Reinsch, H.M. Schmid, R. Sari, D.H. Hartmann, C. Kouveliotou, A. Rau, E. Palazzi, C. Straubmeier, B. Stecklum, S. Zharikov, G. Tovmassian, O. Barnbantner, C. Ries, E. Jehin, A. Henden, A.A. Kass, T. Grav, J. Hjorth, H. Pedersen, R.A.M.J. Wijers, A. Kaufer, H.-S. Park, G. Williams, and O. Reimer.
32. Extended Burst Tail From SGR 1900+14 With a Thermal X-Ray Spectrum (An), *Astrophys. J.*, 587, 761–770, April 20, 2003. G.T. Linters, P.M. Woods, J. Goupell, C. Kouveliotou, E. Gogus, K. Hurley, D. Frederiks, S. Golenetskii, and J.H. Swank.
33. Filament Eruption Without Coronal Mass Ejections, *Geophys. Res. Lett.*, 30, 2107, November 2003. D.P. Choudhary and R.L. Moore.
34. First X-Ray Scattering Studies on Electrostatically Levitated Metallic Liquids: Demonstrated Influence of Local Icosahedral Order on the Nucleation Barrier, *Phys. Rev. Lett.*, 90(19), ID 195504, DOI 10.1103/PhysRevLett.90.195504, May 16, 2003. K.F. Kelton, G.W. Lee, A.K. Gangopadhyay, R.W. Hyers, T.J. Rathz, J.R. Rogers, M.B. Robinson, and D.S. Robinson.
35. Global Frequency and Distribution of Lightning as Observed From Space by the Optical Transient Detector, *J. Geophys. Res.*, 108(D1), 4005–4019, DOI 10.1029/2002JD002347, January 2003. H.J. Christian, R.J. Blakeslee, D.J. Boccippio, W.L. Boeck, D.E. Buechler, K.T. Driscoll, S.J. Goodman, J.M. Hall, W.J. Koshak, D.M. Mach, and M.F. Stewart.
36. GRB 011121: A Collimated Outflow Into Wind-Blown Surroundings, *Astrophys. J.*, 2003. J. Greiner, S. Klose, M. Salvato, A. Zeh, R. Schwarz, D.H. Hartmann, N. Masetti, B. Stecklum, G.L. Lamer, N.B. Lodieu, R.D. Scholz, C. Sterken, J. Gorosabel, I. Burud, J.E. Rhoads, I.G. Mitrofanov, M.L. Litvak, A.B. Sanin, V. Grinkov, M.I. Andersen, J.M. Castro-Ceron, A.J. Castro-Tirado, A.S. Fruchter, J.P.U. Fynbo, J. Hjorth, L. Kaper, C. Kouveliotou, E. Palazzi, E. Pian, E. Rol, N.R. Tanvir, P.M. Vreeswijk, R.A.M.J. Wijers, E. van den Heuvel.
37. Hard X-Ray Lightcurves of High Mass X-Ray Binaries, *M.N.R.A.S.*, 338, 211–218, January 2003. B.A. Harmon, M.H. Finger, and C.A. Wilson.
38. How Sample Completeness Affects Gamma-Ray Burst Classification, *Astrophys. J.*, 582, 320–329, January 1, 2003. J. Hakkila, T.W. Giblin, R.J. Roiger, D.J. Haglin, W.S. Paciesas, and C.A. Meegan.
39. Identifying the Plasmapause in IMAGE EUV Data Using IMAGE RPI In Situ Steep Density Gradients, *J. Geophys. Res.*, 108(A4), 1147, DOI 10.1029/2002JA9475, April 2003. J. Goldstein, M. Spasojevic, P. Reiff, B.R. Sandel, T.T. Forrester, D.L. Gallagher, and B.W. Reinisch.

Refereed Journal Articles (Continued)

40. Imaging Modulated Reflections From a Semi-Crystalline State of Profilin: Actin Crystals, *J. Appl. Crystall.*, DOI 10.1029/2002JA009475, April 2003. J. Lovelace, H. Bellamy, E.H. Snell, and G. Borgstahl.
41. Indigenous and Contaminant Microbes in Ultradeep Mines, *J. Environmental Microbiology*, 5, 1168–1191, 2003. T.C. Onstott, D.P. Moser, S.M. Pfiffner, J.K. Fredrickson, F.J. Brockman, T.J. Phelps, D.C. White, A. Peacock, D. Balkwill, R.B. Hoover, L.R. Krumholz, M. Borscik, T.L. Kieft, and R. Wilson.
42. Laminar-Turbulent Transition in an Electromagnetically-Levitated Droplet, *Metallurgical and Mat. Trans.*, 34B(2), 29–36, February 2003. R.W. Hyers, G. Trapaga, and B. Abedian.
43. Land Use and Land Cover Change, Urban Heat Island Phenomenon, and Health Implications: A Remote Sensing Approach, *J. Photogrammetric Engineering and Remote Sensing*, 69(9), 1053–1063, 2003. C.P. Lo and D.A. Quattrochi.
44. Landscape Archaeology: Remote Sensing Investigations of the Ancient Maya in the Peten Rainforest of Northern Guatemala, *Ancient Mesoamerica*, Vanderbilt Univ., 14(1), 113–122, 2003. T.L. Sever and D.E. Irwin.
45. Lifetime Predictions of a Titanium Silicate Glass With Machined Flaws, *J. Mat. Sci. Lett.*, 22, 1723–1725, 2003. D.S. Tucker, A.T. Nettles, and H. Cagle.
46. Long-Term Properties of Accretion Discs in X-Ray Binaries: I. The Variable Third Period in SMC X–1, *M.N.R.A.S.*, 339(2), 447–454, February 2003. C.A. Wilson, P.A. Charles, W.I. Clarkson, M.J. Coe, S. Laycock, and M. Tout.
47. A Massive Warm Baryonic Halo for the Coma Cluster, *Astrophys. J. Lett.*, 585, 722–729, March 10, 2003. M. Bonamente, R. Lieu, and M.K. Joy.
48. A Measure From Line-of-Sight Magnetograms for Prediction of Coronal Mass Ejections, *J. Geophys. Res.*, 108(A10), 1380, DOI 10.1029/2003JA010030, October 2003. D.A. Falconer, R.L. Moore, and G.A. Gary.
49. Melt-Crucible Wetting Behavior in Semiconductor Melt Growth Systems, *Crys. Res. and Tech.*, 38(7–8), 669–675, 2003. A. Croell, R. Lantzsch, S. Kitanov, N. Salk, F.R. Szofran, and A. Tegetmeier.
50. Monitoring Photodeposition of Polymer Films From Diacetylene Monomer Solutions Using In Situ Real-Time Spectroscopic Ellipsometry, *J. Thin Solid Films*, 437, 127–134, 2003. D. Hui, J.-S. Kim, Y.-T. Kim, I. An, and M.S. Paley.

Refereed Journal Articles (Continued)

51. Morphology and the Strength of Intermolecular Contact in Protein Crystals, *Acta Crystall. D*, 59, 1347–1356, Part 8, August 2003. Y. Matsuura and A.A. Chernov.
52. A New Analytical Approach To Predict Spacing Selection in Lamellar and Rod Eutectic Systems, *Metallurgical and Mat. Trans. A*, 34A(2), 383–384, February 2003. A.V. Catalina, S. Sen, and D.M. Stefanescu.
53. The NRC Research Associateship Program has Greatly Enhanced the Solar Research at Marshall Space Flight Center During the Last Quarter Century, *RAP Sheet: Quarterly Newsletter Nat. Res. Council Res. Associates*, 3(1), 8–10, 2003. G.A. Gary.
54. Observations at Low Latitudes of Magnetic Merging Signatures Within a Flux Transfer Event During a Northward IMF, *J. Geophys. Res.*, 108(A10), 1358, DOI 10.1029/2003JA009852, October 10, 2003. M.O. Chandler and L.A. Avanov.
55. Observations of the Geopause at the Equatorial Magnetopause: Density and Temperature, *Geophys. Res. Lett.*, 30(16), pp. SSC 6–1, Cite ID 1869, DOI 10.1029/2003GL017611, August 2003. M.O. Chandler and T.E. Moore.
56. Origin of the Large Band-gap Bowing in High Mismatched Semiconductor Alloys, *Phys. Rev. Lett. B*, 67(3), ID 03527, January 2003. J. Wu, W. Walukiewicz, K.M. Yu, J.W. Ager III, E.E. Haller, I. Miotkowski, A.K. Ramdas, C.-H. Su, I.K. Sou, R. Perera, and J. Denlinger.
57. Particle Acceleration in Relativistic Jets Due to Weibel Instability, *Astrophys. J.*, 595, 555–563, September 20, 2003. K. Nishikawa, P.E. Hardee, G.A. Richardson, R.D. Preece, H. Sol, and G.J. Fishman.
58. Phase Sensitive X-Ray Diffraction Imaging of Defects in Biological Macromolecular Crystals, *Adv. Photon Source User Activity Rep.*, 142, 3–21, 2003. Z.W. Hu, B. Lai, Y.S. Chu, Z. Cai, D.C. Mancini, B.R. Thomas, and A.A. Chernov.
59. Photoluminescence of CdTe Crystals Grown by Physical Vapor Transport, *J. Electronic Mat.*, 32(7), 747–751, 2003. W. Palosz, K. Grasza, P.R. Boyd, Y. Cui, G. Wright, U.N. Roy, and A. Burger.
60. Physical and Structural Studies on the Cryocooling of Insulin Crystals, *Acta Crystall. D*, D59, 2169–2182, 2003. J. Lovelace, H. Bellamy, E.H. Snell, and G. Borgstahl.
61. Precision Agriculture: Changing the Face of Farming, *GeoTimes*, 26–29, November 2003. D.L. Rickman, J.C. Luvall, P.L. Mask, J.M. Shaw, D. Kissel, and D.G. Sullivan.

Refereed Journal Articles (Continued)

62. Probing the Inflow/Outflow and Accretion Disk of Cyg X–1 in the High State With HETG/Chandra, *Astrophys. J.*, 597(2), 1017–1022, November 10, 2003. Y.X. Feng, A.F. Tennant, and S.N. Zhang.
63. The Promise of Macromolecular Crystallization in Microfluidic Chips, *J. Structural Biology*, 142, 180–187, 2003. M.J. van der Woerd, D.S. Ferree, and M.L. Pusey.
64. A Proposed Mechanism for the Thermal Denaturation of a Recombinant *Bacillus Halmapalus* Alpha-Amylase—the Effect of Calcium Ions, *Biochem. Biophys. Acta*, 1652, 52–63, 2003. A.D. Nielsen, M.L. Pusey, C.C. Fugisang, and P. Westh.
65. Radiation Pressure Measurements on Micron Grains, *J. Geophys. Res.*, 108(A6), 1229, DOI 10.1029/2002JA009744, June 2003. M.M. Abbas, P.D. Craven, J.F. Spann, Jr., D. Tankosic, W.K. Witherow, A. LeClair, E.A. West, R. Sheldon, D.L. Gallagher, M.L. Adrian, G.J. Fishman, and E. Thomas, Jr.
66. The Radio Afterglow of GRB 030329 at Centimeter Wavelengths: Evidence for Multiple Jets or a Structured Jet, *Astrophys. J.*, 2003. E. Rol, A.J. van der Horst, R.A.M.J. Wijers, R. Strom, L. Kaper, C. Kouveliotou, and E.P.J. van den Heuvel.
67. Rapid Assessment of In Situ Wheat Straw Residue Via Remote Sensing Platforms, *Soil Sci. Soc. Am. J.*, 2003. D.G. Sullivan, J.N. Shaw, P.L. Mask, D.L. Rickman, J.C. Luvall, J.M. Wersinger, and E.A. Guertal.
68. RNA Crystallization, *J. Structural Biology*, 142(1), 98–107, April 2003. B.L. Golden and C.E. Kundrot.
69. Self-Consistent Magnetosphere-Ionosphere Coupling: Theoretical Studies, *J. Geophys. Res.*, 108(A3), 1122–1133, DOI 10.1029/2002JA009624, March 2003. G.V. Khazanov, T.S. Newman, M.W. Liemohn, M.-C. Fok, and R.W. Spiro.
70. Self-Consistent Model of Magnetospheric Ring Current and Electromagnetic Ion Cyclotron Waves: The May 2–7, 1998 Storm, *J. Geophys. Res.*, 108(A12), DOI 10.1029/2003JA009833, December 2003. G.V. Khazanov, K.V. Gamayunov, and V.K. Jordanova.
71. The Solar Chromosphere/Corona Interface. I. FUV–EUV Observations and Modeling of Unresolved Coronal Funnels, *Astrophys. J.*, 585, 1095–1113, March 23, 2003. D.S. Martinez-Galarce, A.B.C. Walker, T.W. Barbee II, and R.B. Hoover.
72. Solar Coronal Heating and the Magnetic Flux Content of the Network, *Astrophys. J.*, 593, 549–563, August 10, 2003. D.A. Falconer, R.L. Moore, J.R. Porter, and D.H. Hathaway.

Refereed Journal Articles (Continued)

73. *Spirochaeta Americana* sp. nov., A New Haloalkaliphilic, Obligately Anaerobic Spirochaete Isolated From Soda Mono Lake in California, *Int. J. Systematic and Evolutionary Microbiology*, 53, Part 3, 815–821, May 2003. R.B. Hoover, E.V. Pikuta, A.K. Bej, D. Marsic, W.B. Whitman, J. Tang, and P. Krader.
74. Step Bunching and Solution Flow, *J. Optoelectronics and Adv. Mat.*, 5, 575–587, September 2003. A.A. Chernov.
75. Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-Dependent Enzymes Revealed by Crystal Structure of Human Pyruvate Dehydrogenase, *J. Biological Chem.*, 278(23), 21,240–21,246, 2003. E. Ciszak, L. Korotchkina, P. Dominiak, S. Sidhu, and M. Patel.
76. Sunyaev-Zeldovich Effect Imaging of MACS Galaxy Clusters at $z>0.5$, *Astrophys. J.*, 583(2), 559–565, February 1, 2003. S. LaRoque, M.K. Joy, J.E. Carlstrom, H. Ebeling, M. Bonamente, K. Dawson, A. Edge, W.L. Holzapfel, A. Miller, D. Nagai, S.K. Patel, and E.D. Reese.
77. Temporal Evolution of a Streamer Complex: Coronal and In-Situ Plasma Parameters, *Astrophys. J.*, 593, 1146–1163, August 2003. A. Bemporad, G. Poletto, S.T. Suess, Y. Ko, S. Parenti, P. Riley, M. Romoli, and T. Zurbuchen.
78. Tether-Cutting Energetics of a Solar Quiet Region Prominence Eruption, *Astrophys. J.*, 599, 1418–1425, December 2003. A.C. Sterling and R.L. Moore.
79. Thaumatin Crystallization Aboard the *International Space Station* Using Liquid-Liquid Diffusion in the Enhanced Gaseous Nitrogen Dewar (EGN), *Acta Crystall. D*, 58, 751–760, 2003. C.L. Barnes, E.H. Snell, and C.E. Kundrot.
80. Thermal Diffusivity, Thermal Conductivity, and Specific Heat Capacity Measurements of Molten Tellurium. *J. Crys. Growth*, 250, 269–273, March 2003. S. Zhu, C. Li, C.-H. Su, B. Lin, H. Ben, R.N. Scripa, and S.L. Lehoczky.
81. *Tindallia Californiensis* sp. nov., A New Halo-Alkaliphilic Primary Anaero Isolated From Meromictic Soda, Mono Lake in California, and the Correction of Diagnosis for Genus *Tindallia*, *J. of Extremophiles*, 7, 327–334, 2003. E.V. Pikuta, D. Marsic, R.B. Hoover, V. Kevbrin, W.B. Whitman, P. Krader, and D. Cleland.
82. Unraveling the Cooling Trend of the Soft Gamma Repeater, SGR 162–41, *Astrophys. J. Lett.*, 596, L79–L82, October 2003. C. Kouveliotou, D. Eichler, P.M. Woods, Y. Lyubarsky, S.K. Patel, E. Gogus, M. van der Klis, A.F. Tennant, and S. Wachter.

Refereed Journal Articles (Continued)

83. Vertical Electron Transport Through PbS-EuS Structures, *Acta Physica Polonica*, 103, 637–642, 2003. S. Wrotek, K. Dybko, A. Morawski, A. Makosa, T. Wosinski, T. Fiogielski, Z. Tkaczyk, E. Lusakowska, T. Story, A.Y. Sipatov, A. Szczerbakow, K. Grasza, J. Wrobel, and W. Palosz.
84. A Very Energetic Supernova Associated With the Gamma Ray Burst of 29 March 2003, *Nature*, 423, 847–850, June 2003. J. Hjorth, J. Sollerman, P. Moller, J.P.U. Fynbo, S.E. Woosley, C. Kouveliotou, N.R. Tanvir, J. Greiner, M.I. Andersen, A.J. Castro-Tirado, J.M.C. Ceron, A.S. Fruchter, J. Gorosabel, P. Jakobsson, L. Kaper, S. Klose, N. Masetti, H. Pedersen, K. Petersen, E. Pian, E. Palazzi, J.E. Rhoads, E. Rol, E.P.J. van den Heuvel, P.M. Vreeswijk, D. Watson, and R.A.M.J. Wijers.
85. Whispering-Gallery Mode Splitting in Coupled Micro-Resonators, *J. Opt. Soc. Am.*, 20(9), 1967, September 2003. D.D. Smith, H. Chang, and K.A. Fuller.
86. XTE J0111.2–7317: A Nebula-Embedded X-Ray Binary in the Small Magellanic Cloud, *M.N.R.A.S.*, 344(4), 1075–1084, October 2003. C.A. Wilson, M.J. Coe, N.J. Haigh, and I. Negueruela.
87. XTE J1946+274=GRO J1944+26: An Enigmatic Be/X-Ray Binary, *Astrophys. J.*, 584(2), 996–1007, February 2003. C.A. Wilson, M.H. Finger, M.J. Coe, and I. Negueruela.

Contributions to Books, Conference Proceedings, Etc.

1. Accelerator Tests of the KLEM Prototypes, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 2209–2212. G.L. Bashindzhagyan, J.H. Adams, Jr., P. Bashindzhagyan, N. Baranova, M.J. Christl, A. Chilingarian, I. Chupin, J. Derrickson, L. Drury, N. Egorov, V. Ezhov, S. Golubkov, V. Grebenyuk, N. Hasebe, L.W. Howell, A. Kalinin, D. Karmanov, M. Korolev, N. Korotkova, Y. Kozlov, Z. Krumshtein, M.H. Lee, M. Merkin, H. Nanjo, A. Nozdrin, D. Nozhnin, A. Pakhomov, M.I. Panasyuk, I.H. Park, A. Podorolsky, D. Podorozhnyi, E. Postnikov, T. Roganova, O. Saavedra, A. Sadovski, A. Sidorov, M. Simon, L. Sveshnikova, A. Thompson, L. Tkatchev, A. Turundaevsky, A. Voronin, and J.W. Watts.
2. AGASA Results and EUSO, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1077–1080. M. Nagano and J.H. Adams, Jr.
3. Anaerobic Halo-Alkaliphilic Bacterial Community of Athalassic, Hypersaline Mono Lake in California, *Proceedings of SPIE Conference on Astronomical Telescopes and Instrumentation*, Waikoloa, HI, August 22–28, 2002; *SPIE*, Vol. 4859, pp. 130–144, February 2003. E.V. Pikuta, R.B. Hoover, D. Marsic, and J.D. Ng.
4. Archetypal TRMM Radar Profiles Identified Through Cluster Analysis, *Proceedings of 31st Conference on Radar Meteorology*, Seattle, WA, August 6–12, 2003; Vol. 1, pp. 510–513, 2003. D.J. Boccippio.
5. ATIC Experiment: Elemental Spectra From the Flight in 2000, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1833–1836. H.S. Ahn, J.H. Adams, Jr., G.L. Bashindzhagyan, K.E. Batkov, J. Chang, M.J. Christl, A.R. Fazely, O. Ganel, R.M. Gunansingha, T.G. Guzik, J. Isbert, K.C. Kim, E.N. Kouznetsov, M.I. Panasyuk, A.D. Panov, B. Price, W.K.H. Schmidt, E.S. Seo, R. Sina, N.V. Sokolskaya, J.Z. Wang, J.W. Watts, J.P. Wefel, J. Wu, and V.I. Zatsepin.
6. ATIC Experiment: Flight Data Processing, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 2109–2112. H.S. Ahn, J.H. Adams, Jr., G.L. Bashindzhagyan, K.E. Batkov, J. Chang, M.J. Christl, A.R. Fazely, O. Ganel, R.M. Gunansingha, T.G. Guzik, J. Isbert, K.C. Kim, E.N. Kouznetsov, M.I. Panasyuk, A.D. Panov, W.K.H. Schmidt, E.S. Seo, R. Sina, N.V. Sokolskaya, J.Z. Wang, J. Wu, and V.I. Zatsepin.
7. ATIC Experiment: Preliminary Results From the Flight in 2002, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1853–1856. H.S. Ahn, J.H. Adams, Jr., G.L. Bashindzhagyan, K.E. Batkov, J. Chang, M.J. Christl, M. Cox, S.B. Ellison, A.R. Fazely, O. Ganel, R.M. Gunansingha, T.G. Guzik, J. Isbert, K.C. Kim, E.N. Kouznetsov, A. Malinine, M.I. Panasyuk, A.D. Panov, B. Price, W.K.H. Schmidt, E.S. Seo, R. Sina, D. Smith, N.V. Sokolskaya, M. Stewart, J.Z. Wang, J.W. Watts, J.P. Wefel, J. Wu, and V.I. Zatsepin.

Contributions to Books, Conference Proceedings, Etc. (Continued)

8. The ATIC Science Flight in 2002–03: Description and Preliminary Results, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1849–1852. J.P. Wefel, J.H. Adams, Jr., H.S. Ahn, G.L. Bashindzhagyan, K.E. Batkov, J. Chang, M.J. Christl, M. Cox, S.B. Ellison, A.R. Fazely, O. Ganel, R. Gould, C.P. Granger, D. Granger, R.M. Gunansingha, T.G. Guzik, J. Isbert, K.C. Kim, E.N. Kouznetsov, A. Malinine, M.I. Panasyuk, A.D. Panov, B. Price, W.K.H. Schmidt, E.S. Seo, D. Smith, N.V. Sokolskaya, M. Stewart, J.Z. Wang, J.W. Watts, J. Wu, and V.I. Zatsepin.
9. Binary-Phase Fourier Gratings for Nonuniform Array Generation, *Proceedings of SPIE Optical Science and Technology, 48th Annual Meeting*, San Diego, CA, August 3–8, 2003; *SPIE*, Vol. 5177, pp. 82–91, November 2003. A.S. Keys, R.W. Crow, and P.R. Ashley.
10. Chandra X-Ray Observatory, *Encyclopedia of Space Science and Technology*; Vol. 1, H. Mark (ed.), pp. 276–298, Wiley and Sons, Inc., 2003. M.C. Weisskopf.
11. Characteristics of a Fine Pixel Cadmium-Zinc Telluride Detector, *Proceedings of SPIE Conference on X-Ray and Gamma-Ray Instrumentation for Astronomy XIII (AM117)*, San Diego, CA, August 3–8, 2003; *SPIE*, Vol. 4851, pp. 1019–1028, March 2003. J.A. Gaskin, D.P. Sharma, B.D. Ramsey, and P. Seller.
12. Classifying Urban Land Covers Using Local Indices of Spatial Complexity, *Proceedings of Annual Meeting of the American Society for Photogrammetry and Remote Sensing (ASPRS)*, Anchorage, AK, May 5–7, 2003; CD-ROM. M. Arumugam, C.W. Emerson, N. Lam, and D.A. Quattrochi.
13. Comparison of Measured and Simulated Albedo Signals in the ATIC Experiment, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1861–1864. V.I. Zatsepin, J.H. Adams, Jr., H.S. Ahn, G.L. Bashindzhagyan, K.E. Batkov, J. Chang, M.J. Christl, A.R. Fazely, O. Ganel, R.M. Gunansingha, T.G. Guzik, J. Isbert, K.C. Kim, E.N. Kouznetsov, M.I. Panasyuk, A.D. Panov, W.K.H. Schmidt, E.S. Seo, N.V. Sokolskaya, J.Z. Wang, J.P. Wefel, and J. Wu.
14. Convection and Easterly Waves Observed in the Eastern Pacific ITCZ During EPIC–2001, *Proceedings of American Meteorological Society 25th Conference on Hurricanes and Tropical Meteorology*, San Diego, CA, April 29–May 3, 2002, pp. 521–522, 2003. W.A. Petersen, R. Cifelli, D.J. Boccippio, and S.A. Rutledge.
15. Countering Solutal Buoyant Convection by High Magnetic Fields, *Proceedings of American Institute of Aeronautics and Astronautics (AIAA) 41st Aerospace Sciences Meeting and Exhibit*, Reno, NV, January 6–9, 2003; AIAA 2003–1156, 2003. N. Ramachandran and F. Leslie.
16. Depth Distribution of the Maxima of Extensive Air Shower, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 801–804. J.H. Adams, Jr., and L.W. Howell.

Contributions to Books, Conference Proceedings, Etc. (Continued)

17. Detection of High Energy Cosmic Rays With Advanced Thin Ionization Calorimeter (ATIC), *Proceedings of Coral Gables Conference*, Fort Lauderdale, FL, December 11–15, 2002; *AIP Conf. Proc.*, Vol. 672, No. 1, p. 148, June 20, 2003. J.H. Adams, Jr., E.J. Ahn, G.L. Bashindzhagyan, G. Case, J. Chang, M.J. Christl, S.B. Ellison, A.R. Fazely, O. Ganel, R. Gould, D. Granger, R.M. Gunansingha, T.G. Guzik, Y.J. Han, J. Isbert, H.J. Kim, K.C. Kim, S.K. Kim, I.M. Koo, E.M. Kouznetsov, Y.I. Kwon, L. Mock, M.I. Panasyuk, A.D. Panov, B. Price, G. Samsonov, W.K.H. Schmidt, E.S. Seo, R. Sina, D. Smith, N.V. Sokolskaya, M. Stewart, A. Toptygin, A. Voronin, D. Wagner, J.Z. Wang, J.P. Wefel, M.D. Wefel, J. Wu, and V.I. Zatsepin.
18. Detection of Upward Air Showers With the EUSO Experiments, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 591–593. Y. Takahashi, L. Hillman, A. Zuccaro, J.H. Adams, Jr., and D. Cline.
19. The Development of Hard-X-Ray Optics at MSFC, *Proceedings of SPIE Conference on X-Ray and Gamma-Ray Telescopes and Instruments for Astronomy*, Waikoloa, HI, August 22–28, 2002; *SPIE*, Vol. 4851, pp. 631–638, March 2003. B.D. Ramsey, R.F. Elsner, D.E. Engelhaupt, J.J. Kolodziejczak, S.L. O'Dell, C.D. Speegle, and M.C. Weisskopf.
20. Distributed Sensing of Carbon-Epoxy Composites and Filament Wound Pressure Vessels Using Fiber-Bragg Gratings, *Proceedings of SPIE Conference on Smart Structures and Materials*, San Diego, CA, March 2–6, 2003; *SPIE*, Vol. 5050, pp. 187–196, July 2003. J. Grant, R. Kual, S. Taylor, G. Myer, K. Jackson, A. Osei, and A. Sharma.
21. Diurnal Cycle of Convection in the East Pacific ITCZ During EPIC–2001, *Proceedings of American Meteorological Society 25th Conference on Hurricanes and Tropical Meteorology*, San Diego, CA, April 29–May 3, 2002, pp. 523–524, 2003. D.J. Boccippio, W.A. Petersen, R. Cifelli, and S.A. Rutledge.
22. Experience of Application of Silicon Matrix as a Charge Detector in the ATIC Experiment, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1857–1860. V.I. Zatsepin, J.H. Adams, Jr., H.S. Ahn, G.L. Bashindzhagyan, K.E. Batkov, J. Chang, M.J. Christl, A.R. Fazely, O. Ganel, R.M. Gunansingha, T.G. Guzik, J. Isbert, K.C. Kim, E.N. Kouznetsov, M.I. Panasyuk, A.D. Panov, W.K.H. Schmidt, E.S. Seo, N.V. Sokolskaya, J.Z. Wang, J.P. Wefel, and J. Wu.
23. Global Radius of Curvature Estimation and Control for the Hobby-Eberly Telescope, *Proceedings of SPIE Astronomical Telescopes and Instrumentation, Power Telescopes and Instrumentation Into the New Millennium Conference*, Waikoloa, HI, August 21–28, 2002; *SPIE*, Vol. 4837, No. 79, pp. 681–692, February 2003. J. Rakoczy, D. Hall, R. Howard, W. Ly, J. Weir, and E.E. Montgomery.

Contributions to Books, Conference Proceedings, Etc. (Continued)

24. A Ground-Based UV Light Source for the EUSO Mission, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 919–922. J.H. Adams, Jr., and M.J. Christl.
25. High Energy Cosmic Ray Electron Spectra Measured From the ATIC Balloon Experiment, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1817–1820. J. Chang, W.K.H. Schmidt, J.H. Adams, Jr., H.S. Ahn, G.L. Bashindzhagyan, K.E. Batkov, M.J. Christl, A.R. Fazely, O. Ganel, R.M. Gunansingha, T.G. Guzik, J. Isbert, K.C. Kim, E.N. Kouznetsov, M.I. Panasyuk, A.D. Panov, E.S. Seo, N.V. Sokolskaya, J.Z. Wang, J.P. Wefel, J. Wu, and V.I. Zatsepin.
26. IGR J16358–4726, *IAU Circular No. 8109*, 2003. C. Kouveliotou, S. Patel, A.F. Tennant, P.M. Woods, M.H. Finger, and S. Wachter.
27. Investigation of the Surface Stress in SiC and Diamond Nanocrystals by In-Situ High Pressure Powder Diffraction Technique, *Proceedings of Mat. Res. Soc. (MRS) Symp.*, San Francisco, CA, April 21–25, 2003; Vol. 778, U1.11.1–6, 2003. B. Palosz, S. Stel'makh, E. Grzanka, S. Gierlotka, Y. Zhao, and W. Palosz.
28. JSC Mars-1 Martian Soil Simulant: Melting Experiments and Electron Microprobe Studies. *Proceedings of Microscopy and Microanalysis, 2003; Microsc Microanal 9*, (Suppl 2), pp. 30–31, 2003. P.K. Carpenter, L. Sibille, W. Boles, M. Chadwell, and L. Schwarz.
29. Laboratory Measurements of Optical Properties of Micron Size Individual Dust Grains, *Proceedings of Astrophysics of Dust*, Estes Park, CO, May 26–30, 2003, 2003 asdu.confE.123A, P3.06, 2003. M.M. Abbas, P.D. Craven, J.F. Spann, Fr., D. Tankosic, A. LeClair, W.K. Witherow, R. Camata, and P. Gerakines.
30. Large Scale Flows Through the Solar Cycle, *Proceedings of SOHO 12 Conference "Local and Global Helioseismology: The Present and Future,"* Big Bear Lake, CA, October 27–November 2, 2002; *ESA SP-517*, pp. 87–96, February 2003. D.H. Hathaway.
31. Macromolecular Crystal Quality, *Methods in Enzymology; Macromolecular Crystallography C*, Vol. 368, C.W. Carter and R.M. Sweet (eds.), pp. 268–288, December 2003. E.H. Snell, G. Borgstahl, and H. Bellamy.
32. Managing Radiation Degradation of CCDs on the Chandra X-Ray Observatory, *Proceedings of SPIE Meeting on Astronomical Telescopes and Instrumentation*, Waikoloa, HI, August 22–28, 2002; *SPIE*, Vol. 4851, pp. 77–88, March 2003. S.L. O'Dell, W.C. Blackwell, J.I. Minow, R.A. Cameron, D.C. Morris, and S.N. Virani.

Contributions to Books, Conference Proceedings, Etc. (Continued)

33. Multiple Etalon Systems for the Advanced Technology Solar Telescope, *Proceedings of The Society of Photo-Optical Instrumentation Engineers—Conference on Innovative Telescopes for Solar Astrophysics*, Paris, France, March 18–20, 2002; *SPIE*, Vol. 4853, No. 37, pp. 252–272, 2003. G.A. Gary, K.S. Balasubramaniam, and M. Sigwarth.
34. NASA’s Platform for Cross-Disciplinary Microchannel Research, *Proceedings of First International Conference on Micro Channels and Mini Channels*, Rochester, NY, April 24–25, 2003; ICMM2003–1126, p. 945, 2003. S.Y. Son, S. Spearing, J. Allen, and L.A. Monaco.
35. New Cryogenic Optical Test Capability at Marshall Space Flight Center’s Space Optics Manufacturing Technology Center, *Proceedings of SPIE Astronomical Telescopes and Instrumentation Conference*, Waikoloa, HI, August 22–28, 2002; *SPIE*, Vol. 4850, pp. 407–415, March 2003. J. Kegley.
36. NUCLEON Satellite Mission, Status and Plans, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 2205–2208. G.L. Bashindzhagyan, J.H. Adams, Jr., P. Bashindzhagyan, N. Baranova, M.J. Christl, A. Chilingarian, I. Chupin, J. Derrickson, L. Drury, N. Egorov, V. Ezhov, S. Golubkov, V. Grebenyuk, N. Hasebe, L.W. Howell, A. Kalinin, D. Karmanov, M. Korolev, N. Korotkova, Y. Kozlov, Z. Krumshstein, M.H. Lee, A. Mashkantoev, M. Merkin, H. Nanjo, A. Nozdrin, D. Nozhnin, A. Pakhomov, M.I. Panasyuk, I.H. Park, A. Podorolsky, D. Podorozhnyi, E. Postnikov, T. Roganova, O. Saavedra, A. Sadovski, A. Sidorov, M. Simon, L. Sveshnikova, A. Thompson, L. Tkatchev, A. Turundaevsky, A. Voronin, and J.W. Watts.
37. On a Cyclic Variation of the Hemispheric Helicity Rule, *Proceedings of International Astronomical Union*, Sydney, Australia, July 16, 2003; 2003IAUJD 3E 35p, 2003. A.A. Pevtsov, M.J. Hagyard, Z. Blehm, J.E. Smith, R.C. Canfield, and T. Sakurai.
38. Preliminary Analysis of a CME Observed by SOHO and Ulysses Experiments, *ESA Special Publication Conference Proceedings; ESA SP–535*, pp. 567–570, September 2003. A. Bemporad, G. Poletto, M. Romoli, and S.T. Suess.
39. Preliminary Results From Recent Simultaneous Chandra/HST Observations of Jupiter Auroral Zones, *Proceedings of 35th Annual Meeting of the Division for Planetary Sciences of the American Astronomical Society*, Monterey, CA, September 2–6, 2003; *Bull. AAS*, Vol. 35, No. 4, p. 995, 2003. R.F. Elsner, R. Gladstone, H. Waite, N. Lugaz, T. Majeed, P. Ford, R. Howell, T. Cravens, D. Grodent, and A. Bhardwa.
40. Primary Mirror Figure Maintenance of the Hobby-Eberly Telescope Using the Segment Alignment Maintenance System, *Proceedings of SPIE Astronomical Telescopes and Instrumentation, Power Telescopes and Instrumentation Into the New Millenium Conference*, Waikoloa, HI, August 21–28, 2002.; *SPIE*, Vol. 4837, No. 81, pp. 702–713, February 2003. J. Rakoczy, D. Hall, R. Howard, W. Ly, J. Weir, and E.E. Montgomery.

Contributions to Books, Conference Proceedings, Etc. (Continued)

41. QMI: A Furnace for Metals and Alloys Processing on the *International Space Station*, *Proceedings of 2002 Institute of Electrical and Electronics Engineering Aerospace Conference*, Big Sky, MT, March 8–15, 2003; Vol. 1, p. 65, March 2003. W.E. Carswell, F. Kroeger, and M. Hammond.
42. Relation Between Polar Plumes and Fine Structure in the Solar Wind From Ulysses High-Latitude Observations, *Proceedings of Solar Wind 10 Conference*, Pisa, Italy, June 19, 2002; Vol. 679, pp. 255–258, 2003. Y. Yamauchi, S.T. Suess, and T. Sakurai.
43. Relative Abundances and Energy Spectra of C, N, and O as Measured by the Advanced Thin Ionization Calorimeter Balloon Experiment, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1869–1872. A.R. Fazely, R.M. Gunansingha, J.H. Adams, Jr., H.S. Ahn, G.L. Bashindzhagyan, G. Case, J. Chang, M.J. Christl, S.B. Ellison, O. Ganel, R. Gould, D. Granger, T.G. Guzik, Y.J. Han, J. Isbert, H.J. Kim, K.C. Kim, S.K. Kim, I.M. Koo, E.N. Kouznetsov, Y.I. Kwon, L. Mock, M.I. Panasyuk, A.D. Panov, B. Price, G. Samsonov, W.K.H. Schmidt, E.S. Seo, R. Sina, D. Smith, N.V. Sokolskaya, M. Stewart, A. Toptygin, A. Voronin, D. Wagner, J.Z. Wang, J.P. Wefel, M.D. Wefel, J. Wu, and V.I. Zatsepin.
44. Residual Gas in Closed Systems. I. Development of Gas in Silica Ampoules, *Proceedings of V International Conference on Single Crystals*, Obninsk, Russia, September 22–26, 2003; Vol. 2, pp. 754–762, 2003. W. Palosz.
45. Residual Gas in Closed Systems. II. Formation of Gases From the Source Materials, *Proceedings of V International Conference on Single Crystals*, Obninsk, Russia, September 22–26, 2003; Vol. 2, pp. 763–774, 2003. W. Palosz.
46. Residual Gas in Closed Systems. III. Development and Reduction of Gases Generated by the Source Materials, *Proceedings of V International Conference on Single Crystals*, Obninsk, Russia, September 22–26, 2003; Vol. 2, p. 775, 2003. W. Palosz.
47. Rigidity Spectra of Protons and Helium as Measured in the First Flight of the ATIC Experiment, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 1829–1832. V.I. Zatsepin, J.H. Adams, Jr., H.S. Ahn, G.L. Bashindzhagyan, K.E. Batkov, J. Chang, M.J. Christl, A.R. Fazely, O. Ganel, R.M. Gunansingha, T.G. Guzik, J. Isbert, K.C. Kim, E.N. Kouznetsov, M.I. Panasyuk, A.D. Panov, W.K.H. Schmidt, E.S. Seo, N.V. Sokolskaya, J.Z. Wang, J.P. Wefel, and J. Wu.
48. Ship Radar Observations of a Developing Tropical Storm in the East Pacific, *Proceedings of American Meteorological Society 25th Conference on Hurricanes and Tropical Meteorology*, San Diego, CA, April 29–May 3, 2002, pp. 110–111, 2003. R. Cifelli, W.A. Petersen, D.J. Boccippio, C.W. Fairall, and S.A. Rutledge.

Contributions to Books, Conference Proceedings, Etc. (Continued)

49. Shock Formation and Energy Dissipation of Slow Magnetosonic Waves in Coronal Plumes, *Proceedings of 12th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun—the Future of Cool-Star Astrophysics*, Boulder, CO, July 30–August 3, 2001; *AIP Conf. Proc.*, M. Velli, R. Bruno, and F. Malara (eds.), pp. 624–629, October 2003. M. Cuntz and S.T. Suess.
50. Solar Wind Characteristics From SOHO-Sun-Ulysses Quadrature Observations, *Proceedings of Solar Wind 10 Conference*, Pisa, Italy, June 19, 2002; *AIP Conf. Proc.*, Vol. 679, M. Velli, R. Bruno, and F. Malara (eds.), pp. 102–105, September 2003. G. Poletto and S.T. Suess.
51. Solar Winds, *Encyclopedia of Atmospheric Sciences*, pp. 2078–2085, 2003. S.T. Suess and B. Tsurutani.
52. Solidification Using the Baffle in Sealed Ampoules, *Proceedings of 41st AIAA Aerospace Sciences Meeting*, Reno, NV, January 6–9, 2003; AIAA 2003–1309, 2003. A.G. Ostrogorsky, C. Marin, A. Churilov, M.P. Volz, W.A. Bonner, R. Spivey, and G.A. Smith.
53. A Sterile Robotic Mars Soil Analyzer, *Proceedings of SPIE, Instruments, Methods, and Missions for Astrobiology V*, Waikoloa, HI, August 22–23, 2002; *SPIE*, Vol. 4859, pp. 78–86, February 2003. G.V. Levin, J.D. Miller, P.A. Straat, and R.B. Hoover.
54. Three Years of Operation of the Chandra X-Ray Observatory, *Proceedings of SPIE Conference on Astronomical Telescopes and Instrumentation*, Waikoloa, HI, August 22–28, 2002; *SPIE*, Vol. 4851, pp. 1–16, March 2003. M.C. Weisskopf.
55. The Zero-Degree Detector System, *Proceedings of 28th International Cosmic Ray Conference*, Tsukuba, Japan, July 31–August 7, 2003; Universal Academy Press, Inc., Tokyo, pp. 2229–2232. J.H. Adams, Jr. and E.N. Kouznetsov.

Published Abstracts

1. Analytic Solution to the Problem of Aircraft Electric Field Mill Calibration, 2003 Fall Meeting of the American Geophysical Union, San Francisco, CA, December 8–12, 2003; *Eos*, 84(46), F106, November 2003. W.J. Koshak.
2. Automated Coronal Loop Identification Using Digital Image Processing Techniques, 34th Meeting of the Solar Physics Division of the American Astronomical Society, Laurel, MD, June 16–20, 2003; *Bull. AAS*, 2003SPD 34–0305L, May 2003. G.A. Gary.
3. Beyond Solar-B: MTRAP, the Magnetic TRAnsition Region Probe, 34th Meeting of the Solar Physics Division of the American Astronomical Society, Laurel, MD, June 16–20, 2003; *Bull. AAS*, 2003SPD 34–2014D, May 2003. J.M. Davis, R.L. Moore, and D.H. Hathaway.
4. CME Prediction From Line-of-Sight Magnetogram, 34th Meeting of the Solar Physics Division of the American Astronomical Society, Laurel, MD, June 16–20, 2003; *Bull. AAS*, 2003SPD 34–0503F, May 2003. D.A. Falconer, R.L. Moore, and G.A. Gary.
5. Conjugate Auroral Imagery, 2003 Fall Meeting of the American Geophysical Union, San Francisco, CA, 2003; *Eos*, 84(46), F1298, 2003. J.F. Spann, Jr.
6. Coronal Heating and the Magnetic Flux Content of the Network, 34th Meeting of the Solar Physics Division of the American Astronomical Society, Laurel, MD, June 16–20, 2003; *Bull. AAS*, 2003SPD 34–1010M, May 2003. R.L. Moore, D.A. Falconer, J.G. Porter, and D.H. Hathaway.
7. Evidence That a Deep Meridional Flow Sets the Sunspot Cycle Period, 34th Meeting of the Solar Physics Division of the American Astronomical Society, Laurel, MD, June 16–20, 2003; *Bull. AAS*, 2003SPD 34–2604H, May 2003. D.H. Hathaway, D. Nandy, R.M. Wilson, and E.J. Reichmann.
8. Objective Classification of Radar Profile Types and Their Relationship to Lightning Occurrence, 2003 Fall Meeting of the American Geophysical Union, San Francisco, CA, 2003; *Eos*, 84(46), F203, November 2003. D.J. Boccippio.
9. Parametric Transformation Analysis, 34th Meeting of the Solar Physics Division of the American Astronomical Society, Laurel, MD, June 16–20; 2003; *Bull. AAS*, 2003SPD 34–1609G, May 2003, G.A. Gary.
10. Preliminary Results From Recent Simultaneous Chandra/HST Observations of Jupiter Auroral Zones, 202nd Meeting of the American Astronomical Society, Nashville, TN, May 25–29, 2003; *Bull. AAS*, 2003DPS 35–4005E, May 2003. R.F. Elsner, G.R. Gladstone, J.H. Waite, T. Majeed, P.G. Ford, D. Grodent, A. Bhardwaj, R.R. Howell, T.E. Cravens, R. MacDowell, M. Desch, and N. Lugaz.

Published Abstracts (Continued)

11. Properties of Ultra-Luminous X-Ray Sources in the Chandra Archive of Galaxies, 202nd Meeting of the American Astronomical Society, Nashville, TN, May 25–29, 2003; *Bull. AAS*, 2003AAS 202–1109S, May 2003. D.A. Swartz, K.K. Ghosh, and A.F. Tennant.
12. A Step Beyond Simple Keyword Searches: Services Enabled by a Full Content Digital Journal Archive, 2003 Fall Meeting of the American Geophysical Union, San Francisco, CA, 2003; *Eos*, 84(46), F440, November 2003. D.J. Boccippio.
13. Stormtime Particle Energization With AMIE Potentials, 2003 Fall Meeting of the American Geophysical Union, San Francisco, CA, 2003; *Eos*, 84(46), F1308, November 2003. G.V. Khazanov, M.W. Liemohn, T.S. Newman, M.-C. Fok, and A.J. Ridley.
14. A Study of the X-Ray Source Population in the Dwarf Galaxy NGC, 202nd Meeting of the American Astronomical Society, Nashville, TN, May 25–29, 2003; *Bull. AAS*, 2003AAS 202–4007T, May 2003. A.F. Tennant, D.A. Swartz, K.K. Ghosh, and K. Wu.
15. SUMI—The Solar Ultraviolet Magnetograph Investigation, 34th Meeting of the Solar Physics Division of the American Astronomical Society, Laurel, MD, June 16–20, 2003, *Bull. AAS*, 2003SPD 34–2015P, May 2003. J.G. Porter, E.A. West, J.M. Davis, G.A. Gary, M. Noble, R.J. Thomas, D.M. Rabin, and H. Uitenbroek.
16. What are the Causes of the Formation of the Sub-Alfvenic Flows at the High Latitude Magnetopause, 2003 Fall Meeting of the American Geophysical Union, San Francisco, CA, 2003; *Eos*, 84(46), F1321, November 2003. L.A. Avanov, M.O. Chandler, V.N. Sirnov, and O.L. Vaisberg.

PRESENTATIONS

1. ACES: A Unique Platform for Electrodynamic Studies of Upward Currents Into the Middle Atmosphere, International Conference on Atmospheric Electricity (ICAE) 2003, Versailles, France, June 9–14, 2003. W.M. Farrell, R.A. Goldberg, R.J. Blakeslee, M.D. Desch, J.G. Houser, J.D. Mitchell, C.L. Crosky, D.M. Mach, and J.C. Bailey.
2. Activation of Cyclic AMP Synthesis by Full and Partial Beta-Adrenergic Receptor Agonists in Chicken Skeletal Muscle Cells, Molecular Biology of Muscle Development and Regeneration Conference, Banff, Canada, May 29–June 4, 2003. R.B. Young and K.Y. Bridge.
3. AFM Studies of Salt Concentration Effects on the (110) Surface Structure of Tetragonal Lysozyme Crystals, Biophysical Society Meeting, San Antonio, TX, March 1–5, 2003. M.L. Pusey, S. Gorti, E.L. Forsythe, and J. Konnert.
4. Alpha-Amylase From the Hyperthermophilic Archaeon *Thermococcus Thioireducens*, American Society for Gravitational and Space Biology (ASGSB), Huntsville, AL, November 12–16, 2003. E.C.M.J. Bernhardsdotter, M.L. Pusey, J.D. Ng, and O.K. Garriott.
5. Alternative Hypothesis for High Microgravity Improves Macromolecular Crystal Quality (An), American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. M.L. Pusey.
6. The Altus Cumulus Electrification Study (ACE): A UAV-Based Science Demonstration, International Conference on Atmospheric Electricity ICAE 2003, Versailles, France, June 9–14, 2003. R.J. Blakeslee, C.L. Crosky, M.D. Desch, W.M. Farrell, R.A. Goldberg, J.G. Houser, H.S. Kim, D.M. Mach, J.D. Mitchell, and J.C. Stoneburner.
7. Application of Land Surface Data Assimilation to Simulations of Sea Breeze Circulations, AMS Conference 83rd Annual Meeting of the American Meteorological Society, Long Beach, CA, February 9–13, 2003. S. Mackaro, W.M. Lapenta, K. Blackwell, R.J. Suggs, R.T. McNider, G.J. Jedlovec, and S. Kimball.
8. Asymmetric Stokes-V Profiles at the Penumbra Boundary of a Sunspot, Fifth Solar-B Science Meeting, Tokyo, Japan, November 12–14, 2003. D.P. Choudhary, K.S. Balasubramaniam, and Y. Suematsu.
9. Atmospheric Electrical Activity and the Prospects for Improving Short-Term Weather Forecasting, 12th International Conference on Atmospheric Electricity, Versailles, France, June 9–13, 2003. S.J. Goodman.

PRESENTATIONS (Continued)

10. A Biodosimeter for Multiparametric Determination of Radiation Dose, Radiation Quality, and Radiation Risk, World Congress on Medical Physics and Biomedical Engineering, Sydney, Australia, August 24–29, 2003. R.C. Richmond, A. Cruz, H. Jansen, and K. Bors.
11. Biomaterials and Magnetic Fields for Cancer Therapy, Conference on Space Technologies, Colorado Springs, CO, November 4–6, 2003. N. Ramachandran and K. Mazuruk.
12. Bubble Formation and Transport During Microgravity Materials Processing Model Experiments on the *International Space Station*, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. R.N. Grugel, A.V. Anilkumar, and C.P. Lee.
13. Chandra Observations of M28, Restless High-Energy Universe Conference, Amsterdam, The Netherlands, May 5–8, 2003. M.C. Weisskopf, W. Becker, D.A. Swartz, G.G. Pavlov, R.F. Elsner, J. Grindlay, R. Mignani, A.F. Tennant, D. Backer, L. Pulone, and V. Testa.
14. The Chandra X-Ray Observatory Radiation Environment Model, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 5–10, 2003. S.L. O'Dell, W.C. Blackwell, J.I. Minow, S. Smith, W.R. Swift, and R.A. Cameron.
15. Characterization of a 2-mm Thick, 16×16 Cadmium-Zinc-Telluride Pixel Array, IEEE's Symposium on Nuclear Power Systems, 13th International Workshop on Room Temperature Semiconductor X- and Gamma-Ray Detectors, Portland, OR, October 19–25, 2003. J.A. Gaskin, G.A. Richardson, S. Mitchell, D.P. Sharma, B.D. Ramsey, and P. Seller.
16. Charge Loss and Charge Sharing Measurements for Two Different Pixelated Cadmium-Zinc-Telluride Detectors, HEAD 2003—Seventh AAS High Energy Astrophysics Division Meeting, Mt. Tremblant, Quebec, Canada, March 23–26, 2003. J.A. Gaskin, D.P. Sharma, B.D. Ramsey, and P. Seller.
17. Cluster Masses Derived From X-Ray and Sunyaev-Zeldovich Effect Measurements, HEAD 2003—Seventh Meeting of the AAS High Energy Astrophysics Division, Mt. Tremblant, Quebec, Canada, March 23–26, 2003. S. LaRoque, M.K. Joy, M. Bonamente, J.E. Carlstrom, and K.S. Dawson.
18. CME Prediction From Magnetograms, Solar, Heliospheric, and Interplanetary Environment (SHINE), Maui, HI, July 6–11, 2003. D.A. Falconer, R.L. Moore, and G.A. Gary.
19. Coherent Effects in Tiny Optics: Tunneling Through the Looking Glass, Jet Propulsion Laboratory (JPL), Pasadena, CA, September 30, 2003. D.D. Smith.

PRESENTATIONS (Continued)

20. Collaborating With Planetaria To Improve Girl Scouts' Appreciation of Astronomy, 202nd Meeting of the American Astronomical Society, Nashville, TN, May 25–29, 2003. M.L. Adams, T. Phillips, and A. Whitt.
21. Commercial Research Results From the *International Space Station*, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. M.E. Nall.
22. Comparative Results of Using Different Methods for Discovery of Microorganisms in Very Ancient Layers of the Central Antarctic Glacier Above the Lake Vostok, 34th COSPAR Scientific Assembly, The Second World Space Congress, Houston, TX, October 10–19, 2002. S.S. Abyzov, R.B. Hoover, S. Imura, I.N. Mitskevich, T. Naganuma, M.N. Poglazova, and M.V. Ivanov.
23. Control of Thermal Convection in Layered Fluids Using Magnetic Fields, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. N. Ramachandran and F.W. Leslie.
24. Countering Solutal Buoyant Convection With High Magnetic Fields, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. N. Ramachandran and F.W. Leslie.
25. Cryogenic Properties of Several Aluminum-Beryllium Alloys and Beryllium Oxide Materials, Technology Days 2003, SD70 Website, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. W.R. Gamwell and P.B. McGill.
26. Crystal Growth Rate Dispersion: A Predictor of Crystal Quality in Microgravity? American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. R. Kephart, R.A. Judge, E.H. Snell, and M.J. van der Woerd.
27. Crystal Structure of the Catalytic Domain of a Serine Threomine Protein Phosphatase, American Crystallographic Association (ACA), Covington, KY, July 26–31, 2003. M.R. Swingle, R. Honkanen, and E.M. Ciszak.
28. The Deflection Plate Analyzer: A Technique for Space Plasma Measurements Under Highly Disturbed Conditions, Eighth Spacecraft Charging Technology Conference, Huntsville, AL, October 20–24, 2003. K.H. Wright, K. Dutton, N.G. Martinez, D. Smith, and N.H. Stone.
29. Design and Analysis of a Microelectromechanical Systems (MEMS) Micro-Translation Stage With Indefinite Linear Translation, Nanospace 2003, Galveston, TX, September 2, 2003. C.K. Ferguson, M. Abushagur, J.M. English, and G.P. Nordin.
30. Design and Preparation of a Particle Dynamics Space Flight Experiment, SHIVA, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences III Conference, Davos,

PRESENTATIONS (Continued)

Switzerland, September 14–19, 2003. J.D. Trolinger, D. L'Esperance, R. Rangel, C. Coimbra, and W.K. Witherow.

31. Design Features and Capabilities of the First Materials Science Research Rack, 2003 Institute of Electrical and Electronics Engineering Aerospace Conference, Big Sky, MT, March 8–15, 2003. P.J. Pettigrew, S.L. Lehoczky, S.D. Cobb, T. Holloway, and L. Kitchens.
32. Design of a Ferroelectric Programmable Logic Gate Array, 14th International Symposium on Integrated Ferroelectrics, Colorado Springs, CO, March 12, 2003. T.C. MacLeod and F.D. Ho.
33. Detached Growth of Germanium, International Conference on Single Crystals, Obninsk, Russia, September 21–26, 2003. M.P. Volz, W. Palosz, and F.R. Szofran.
34. Determination of Nucleation Kinetic Parameters of Metallic Melts Using Electrostatic Levitation Techniques, 15th International Symposium on Experimental Methods for Microgravity Materials Science, San Diego, CA, March 6–9, 2003. M.J. Wert, W.H. Hofmeister, R.J. Bayuzick, J.R. Rogers, T.J. Rathz, G. Fountain, and R.W. Hyers.
35. Development of Graphite Fiber Reinforced Mg Alloys for Use as Space and Tactical Mirrors, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. J.A. Cornie, L. Ballard, and S. Zhang.
36. The Development of the Chandra X-Ray Observatory, Chandra Fellows Symposium, Cambridge, MA, October 8, 2003. M.C. Weisskopf.
37. Electron Probe MicroAnalysis (EPMA) Standards, Issues Related to Measurement and Accuracy Evaluation in EPMA, Electron Probe MicroAnalysis (EPMA) Workshop, University of Oregon, Eugene, OR, September 24–26, 2003. P.K. Carpenter.
38. Enabling Sustainable Exploration Through the Commercial Development of Space, 54th International Astronautical Congress, Bremen, Germany, September 29–October 3, 2003. M.E. Nall and J. Casas.
39. Enhancement of Optical Nonlinearities in Composite Media and Structures via Local Fields and Electromagnetic Coupling Effects, 33rd Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT, January 5–9, 2003. D.D. Smith.
40. Error Analyses of the North Alabama Lightning Mapping Array (LMA), International Conference on Atmospheric Electricity (ICAE) 2003, Versailles, France, June 9–13, 2003. W.J. Koshak, R.J. Solakiewicz, R.J. Blakeslee, S.J. Goodman, H.J. Christian, J.M. Hall, J.C. Bailey, E.P. Krider, M.G. Bateman, D.J. Boccippio, D.M. Mach, E.W. McCaul, Jr., M.F. Stewart, D.E. Buechler, and W.A. Petersen.

PRESENTATIONS (Continued)

41. The EUSO Mission, The Second International Conference on Particle and Fundamental Physics in Space, Washington, DC, December 10–12, 2003. J.H. Adams, Jr.
42. Evolution of Local Microstructures of Clusters Undergoing 2-Dimensional Diffusion, Lecture at CosmoCaixa (“La Caixa Foundation” new Science Museum), Madrid, Spain, March 26–28, 2003. D.O. Frazier.
43. Evolution of Local Microstructures: Spatial and Temporal Correlation in Clusters Undergoing 2-Dimensional Diffusion, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. D.O. Frazier, J.R. Rogers, W.K. Witherow, B.R. Facemire, R. Inguva, and M.E. Glicksman.
44. Examination of Short- and Long-Range Atomic Order in Nanocrystalline SiC and Diamond by Powder Diffraction Methods, 225th American Chemical Society Meeting, New Orleans, LA, March 23–27, 2003. B. Palosz, S.E. Grzanka, S. Stel’makh, S. Gierlotka, H. Weber, T. Proffe, and W. Palosz.
45. Examination of the Atomic Pair Distribution Function (PDF) of SiC Nanocrystals by In-Situ High Pressure Diffraction, European Materials Research Society Meeting, Warsaw, Poland, September 15–19, 2003. E. Grzanka, S. Stel’makh, S. Gierlotka, Y. Zhao, B. Palosz, and W. Palosz.
46. EXIST: The Next Large GRB Observatory, EXIST Science Working Group Meeting, Mt. Tremblant, Quebec, Canada, March 23–26, 2003. G.J. Fishman.
47. Experiences With Lab-on-a-Chip Technology in Support of NASA Supported Research, Seminar at Johnson Space Center, Houston, TX, August 18, 2003. L. Monaco.
48. First Post-Flight Status Report for the Microgravity Science Glovebox, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. C.R. Baugher.
49. The Formation of Relativistic Jets From Kerr Black Holes, Particle Acceleration in Astrophysical Objects, Kraków, Poland, June 24–28, 2003. K. Nishikawa, G.A. Richardson, R.D. Preece, P.E. Hardee, S. Koide, K. Shibata, T. Kudoh, H. Sol, and G.J. Fishman.
50. Fundamentals of Plasma Salts Propulsion Concept, 39th AIAA ASME/SAE/ASEE Joint Propulsion Conference, Huntsville, AL, July 20–23, 2003. G.V. Khazanov, P.A. Delamere, and K. Kabin.
51. Gamma-Ray Bursts, IAU Colloquium #192, Supernova, Valencia, Spain, April 22–26, 2003. G.J. Fishman.
52. Global Lightning Activity, 12th International Conference on Atmospheric Electricity, Versailles, France, June 9–13, 2003. H.J. Christian.

PRESENTATIONS (Continued)

53. GOES Cloud Detection at the Global Hydrology and Climate Center, AMS Conference 83rd Annual Meeting of the American Meteorological Society, Long Beach, CA, February, 9–13, 2003. K. Laws and G.J. Jedlovec.
54. Gravity Probe B: Testing Einstein With Gyroscopes, AIAA Space 2003 Conference and Exposition, Long Beach, CA, September 23–25, 2003. R.D. Geveden and T. May.
55. Growing Larger Crystals for Neutron Diffraction, Fifth International Symposium on Organized Research Combination System (ORCS), Ibaraki, Japan, November 19–21, 2003. M.L. Pusey.
56. High Accuracy Thermal Expansion Measurement at Cryogenic Temperatures, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. J. Tucker, G. Daspit, M.A. Stallcup, J. Presson, and M. Nein.
57. High Accuracy Thermal Expansion Measurement at Cryogenic Temperatures, SPIE Optical Science and Technology Conference, San Diego, CA, August 3–8, 2003. J. Tucker, G. Daspit, M.A. Stallcup, J. Presson, and M. Nein.
58. Hot Views on Cold Crystals—The Application of Thermal Imaging in Cryocrystallography, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. E.H. Snell, M.J. van der Woerd, and A. Deacon.
59. Hot Views on Cold Crystals—The Application of Thermal Imaging in Cryocrystallography, Argonne National Laboratory, Chicago, IL, April 29–30, 2003. E.H. Snell.
60. Hot Views on Cold Crystals—The Application of Thermal Imaging in Cryocrystallography, Phoenix Camera Working Group Meeting, Oak Ridge, TN, May 7–9, 2003. E.H. Snell.
61. Hot Views on Cold Crystals—The Application of Thermal Imaging in Cryocrystallography, 21st European Crystallography Meeting, Durban, South Africa, August 25–28, 2003. E.H. Snell, M.J. van der Woerd, and A. Deacon.
62. Hot Views on Cold Crystals—The Application of Thermal Imaging in Cryocrystallography, American Crystallographic Association (ACA), Covington, KY, July 26–31, 2003. E.H. Snell, M.J. van der Woerd, and A. Deacon.
63. IMAGE Observations of Plasmasphere/Ring Current Interactions, International Union of Geodesy and Geophysics, Sapporo, Japan, July 8, 2003. D.L. Gallagher, M.L. Adrian, J. Perez, and B.R. Sandel.
64. In-Situ Pressure Measurements During the Detached Growth of Germanium, ECI Microgravity Transport Processes in Fluid, Thermal, Biological and Materials Sciences III, Davos, Switzerland, September 14–19, 2003. M.P. Volz, W. Palosz, and F.R. Szofran.

PRESENTATIONS (Continued)

65. In-Situ Pressure Measurements During the Detached Growth of Germanium, International Conference on Single Crystals, Obninsk, Russia, September 21–26, 2003. M.P. Volz, W. Palosz, and F.R. Szofran.
66. In-Space Fabrication and Repair Utilizing In Space Resources, Center for Commercial Applications of Combustion in Space Annual Meeting, Golden, CO, September 24–26, 2003. P.A. Curreri.
67. Integrated Optical Design Analysis (IODA)—New Test Data and Modeling Features, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. J.D. Moore, E. Troy, and B. Patrick.
68. The Interaction Between an Insoluble Particle and an Advancing Solid/Liquid Interface: Micro-Gravity Experiments and Theoretical Developments, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. A.V. Catalina, S. Sen, and D.M. Stefanescu.
69. Interannual Variability of the Tropical Water Cycle: Capabilities in the TRMM Era and Challengers for GPM. International Union of Geodesy and Geophysics (IUGG), Sapporo, Japan, June 30–July 11, 2003. F.R. Robertson.
70. Investigation of Carbon-Polymer Structures With Embedded Fiber-Optic Bragg Gratings, NASA/MSFC 2003 Propulsion Measurement Sensor Development Workshop, Huntsville, AL, May 13–15, 2003. J. Grant, R. Kaul, S. Taylor, G. Myers, and A. Sharma.
71. Investigation of the Surface Stress in SiC and Diamond Nanocrystals by In-Situ High Pressure Powder Diffraction Technique, Materials Research Society Spring Meeting, San Francisco, CA, April 21–25, 2003. B. Palosz, S. Stel'makh, S.E. Grzanka, S. Gierlotka, Y. Zhao, and W. Palosz.
72. Land Surface Temperature Retrievals From GOES-8 Using Emissivities Retrieved from MODIS, AMS Conference 83rd Annual Meeting of the American Meteorological Society, Long Beach, CA, February 9–13, 2003. R.J. Suggs, G.J. Jedlovec, W.M. Lapenta, and S.L. Haines.
73. Lessons Learned During Cryogenic Optical Testing of the Advanced Mirror Systems Demonstrators (AMSDs), Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. J.B. Hadaway, P. Reardon, J. Geray, B. Robinson, H.P. Stahl, R. Eng, and J. Kegley.
74. The Light of the Night Sky in EUSO Duty Cycle and Background, 28th International Cosmic Ray Conference, Tsukuba, Japan, July 31–August 7, 2003. J.H. Adams, Jr., C. Berat, D. Lebrun, and F. Montanet.

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75. Lightning and Precipitation: Observational Analysis of LIS and PR, European Geoscience, Fifth Plinius Conference, Mediterranean Storms, Ajaccio, Corsica, France, October 1–3, 2003. C. Adamo, R. Solomon, S.J. Goodman, S. Dietrich, and A. Mugnai.
76. Limited Angle Reconstruction Method for Reconstructing Terrestrial Plasmaspheric Densities, The Applied Information Systems Research Program (AISRP), University of Pittsburgh, PA, October 28–29, 2003. T.S. Newman, N. Santhanam, H. Zhang, and D.L. Gallagher.
77. Long Focal Length Large Mirror Fabrication System, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. H.E. Bennett.
78. Low Cost Precision Carbon-Carbon Mirrors and Telescope Structures for Exoatmospheric Interceptor Structures, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. G.D. Wonacott.
79. Macromolecular Expression and Function—A New Paradigm for NASA Risk Assessment, Biotechnology Research Seminar, The University of Alabama in Huntsville, Huntsville, AL, September 12, 2003. R.C. Richmond.
80. Macromolecular Topography Leaps Into the Digital Age, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. J. Lovelace, H. Bellamy, E.H. Snell, and G. Borgstahl.
81. Magnetic Microspheres and Tissue Model Studies for Therapeutical Applications, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. N. Ramachandran and K. Mazuruk.
82. Mapping the Ancient Maya Landscape From Space, Fifth World Archaeological Conference, Washington, DC, June 24–26, 2003. T.L. Sever.
83. Mathematical Inversion of Lightning Data: Techniques and Applications, University of Nevada, Las Vegas, NV, February 6, 2003. W.J. Koshak.
84. Measurement of Characteristics of Micron Size Individual Dust Particles of Astrophysical Interest, 10th Workshop on the Physics of Dusty Plasmas, St. Thomas, U.S. Virgin Islands, June 18–21, 2003. P.D. Craven, M.M. Abbas, D. Takosic, and J.F. Spann, Jr.
85. Microfossils in CI and CO Carbonaceous Meteorites, SPIE Conference on Instruments, Methods, and Missions for Astrobiology VII (AM121), San Diego, CA, August 3–8, 2003. R.B. Hoover, A.Y. Rozanov, G. Jerman, and J. Costen.

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86. Microfossils in the Murchison and Rainbow Carbonaceous Meteorites, SPIE Conference on Astronautical Telescopes and Instruments, Waikoloa, HI, August 22–28, 2002. R.B. Hoover, A.Y. Rozanov, G. Jerman, and P.C. Davies.
87. Modeling Tetragonal Lysozyme Crystal Growth Rates, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. S. Gorti, E.L. Forsythe, and M.L. Pusey.
88. Modified Laser Flash Method for Thermal Properties Measurements and the Influence of Heat Convection, International Mechanical Engineering Congress and Research and Development Exposition, Washington, DC, November 15–21, 2003. B. Lin, S. Zhu, H. Ban, C. Li, R.N. Scripa, C.-H. Su, and S.L. Lehoczky.
89. Multi-Satellite Observations of Oceanic Lightning, 12th International Conference on Atmospheric Electricity, Versailles, France, June 9–14, 2003. W.L. Boeck, A.R. Jacobson, H.J. Christian, and S.J. Goodman.
90. The Mundrabilla Meteorite in Three-Dimensions, National Museum of Natural History, Washington, DC, July 18, 2003. D.C. Gillies.
91. NASA Earth Science Research and Applications Using UAVs, Technical Analysis and Applications Center (TAAC) 2003 UAV Conference, Albuquerque, NM, October 28–30, 2003. A.R. Guillory.
92. NASA Marshall Engineering Thermosphere Model—Version 2.0 (MET-V2-0), 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. J.K. Owens and W.W. Vaughan.
93. NASA's Space Science Programming Possibilities for Planetaria, South Eastern Planetarium Association 2003, Baton Rouge, LA, June 16–20, 2003. M.L. Adams.
94. Neuregulin—First Steps Towards a Structure, American Crystallographic Association (ACA), Covington, KY, July 26–31, 2003. D.S. Ferree, C.C. Malone, and L.J. Karr.
95. The Nonlinear Coupling of Alfven and Lower Hybrid Waves in Space Plasma, The Fifth International Meeting on Nonlinear Waves and Chaos in Space Plasmas, Mumbai, India, March 2–7, 2003. G.V. Khazanov, N. Singh, and E.N. Krivorutsky.
96. The North Alabama Lightning Mapping Array: Recent Results and Future Prospects, International Conference on Atmospheric Electricity ICAE 2003, Versailles, France, June 9–14, 2003. S.J. Goodman, R.J. Blakeslee, H.J. Christian, W.J. Koshak, J.C. Bailey, J.M. Hall, E.W. McCaul, Jr., D.E. Buechler, W.A. Petersen, C. Darden, and T. Bradshaw.

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97. Numerical Calculation of the Morphology of a Solid/Liquid Interface Near an Insoluble Particle, International Conference of Modeling of Casting, Welding, and Advanced Solidification Processes X, Sandestin, FL, May 25–30, 2003. A.V. Catalina, D.M. Stefanescu, and S. Sen.
98. Observed Helicity of Active Regions in Solar Cycle 21, The Johns Hopkins University Applied Physics Laboratory, Columbia, MD, June 18, 2003. M.J. Hagyard, A.A. Pevtsov, Z. Blehm, and J.E. Smith.
99. On the Nature of the Eclipsing Bright X-Ray Source in the Circinus Galaxy Field, HEAD 2003—Seventh Meeting of the AAS High Energy Astrophysics Division, Mt. Tremblant, Quebec, Canada, March 23–26, 2003. M.C. Weisskopf, K. Wu, A.F. Tennant, and D.A. Swartz.
100. Optical Applications of Nano-Laminates, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. T.W. Barbee II.
101. Optics Needs for Future NASA Missions, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. H.P. Stahl.
102. Optimizing Crystal Growth Conditions for Delta-L: A Solubility Study of Insulin, Seminar for USRP Summer 2003 Program, Marshall Space Flight Center, Huntsville, AL, July 30, 2003. J.L. Baldridge.
103. Origin of Stability in Particle Sedimentation, Seminar at University of Maine, Orono, ME, April 25, 2003. P.N. Segre.
104. Origin of Stability in Sedimentation, Division of Fluid Dynamics 56th Annual Meeting, East Rutherford, NJ, September 23–25, 2003. P.N. Segre.
105. Particle Acceleration and Emission in Relativistic Jets, 28th International Cosmic Ray Conference, Tsukuba, Japan, July 31–August 7, 2003. K. Nishikawa, P.E. Hardee, G.A. Richardson, R.D. Preece, H. Sol, and G.J. Fishman.
106. Particle Acceleration and Emission in Relativistic Jets, Particle Acceleration in Astrophysical Objects, Kraków, Poland, June 24–28, 2003. K. Nishikawa, P.E. Hardee, G.A. Richardson, R.D. Preece, H. Sol, and G.J. Fishman.
107. Particle Acceleration and Radiation Associated With Magnetic Field Generation From Relativistic Collisionless Shocks, Gamma Ray Burst Symposium, Santa Fe, NM, September 8–12, 2003. K. Nishikawa, P.E. Hardee, G.A. Richardson, R.D. Preece, H. Sol, and G.J. Fishman.
108. Perfection of Apoferritin Crystals: An Advanced X-Ray Imaging and Diffraction Study, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. Z.W. Hu, B.R. Thomas, A.A. Chernov, Y.S. Chu, B. Lai, and Z. Cai.

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109. Perfectly Cold Crystals: What Happens When They Are X-Rayed? American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. M.J. van der Woerd, D.S. Ferree, and E.H. Snell.
110. Phase Sensitive X-Ray Diffraction Imaging Study of Protein Crystals, Advanced Photon Source Seminar, Argonne National Laboratory, Chicago, IL, June 30, 2003. Z.W. Hu.
111. Phase-Synchronized Modal Testing of Mirror Membrane, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. T. Rogers.
112. Plasma Sheath Behavior of the ProSEDS Delta II, 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Huntsville, AL, July 20–23, 2003. K.H. Wright, N.H. Stone, B.E. Gilchrist, J.R. Vaughn, and G.P. Garbe.
113. Pore Formation and Mobility Investigation (PFMI): Concept, Hardware Development, and Initial Analysis of Experiments Conducted Aboard the *International Space Station*, Invited Talk to University of Texas, Austin, TX, October 7, 2003. A. Cruz, K. Bors, H. Jansen, and R.C. Richmond.
114. Pore Formation and Mobility Investigation (PFMI): Description and Initial Analysis of Experiments Conducted Aboard the *International Space Station*, 15th American Conference on Crystal Growth and Epitaxy (ACCGE), Keystone, CO, July 20–24, 2003. R.N. Grugel, A.V. Anilkumar, and C.P. Lee.
115. Preliminary Optical and Electric Field Pulse Statistics From Storm Overflights During the Altus Cumulus Electrification Study, International Conference on Atmospheric Electricity ICAE 2003, Versailles, France, June 9–14, 2003. D.M. Mach, R.J. Blakeslee, J.C. Bailey, W.M. Farrell, R.A. Goldberg, M.D. Desch, and J.G. Houser.
116. Purification, Crystallization, and Preliminary X-Ray Analysis of Native Canvalin, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. M.L. Pusey, J. Dowell, J.A. Gavira-Gallardo, and J. Ng.
117. Radiation Dose-Effects on Cell Cycle, Apoptosis, and Marker Expression of Ataxia Telangiectasia-Heterozygous Human Breast Epithelial Cells, Fifth Annual Biological Sciences Retreat, Guntersville, AL, October 11, 2003. A. Cruz, K. Bors, H. Jansen, and R.C. Richmond.
118. Radiation Shielding for Manned Deep Space Missions, Radiation Safety for Manned Mission to Mars Conference, Dubna, Russia, September 28–October 2, 2003. J.H. Adams, Jr.
119. Relationships Between Electrical and Radar Characteristics of Thunderstorms Observed During ACES, International Conference on Atmospheric Electricity (ICAE) 2003, Versailles, France, June 9–14, 2003. D.E. Buechler, D.M. Mach, and R.J. Blakeslee.

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120. Residual Gases in Crystal Growth Systems, ECI Microgravity Transport Processes in Fluid, Thermal, Biological and Materials Sciences III, Davos, Switzerland, September 14–19, 2003. W. Palosz.
121. Residual Gases in Crystal Growth Systems: Their Origin, Magnitude and Dependence on the Processing Conditions, International Conference on Single Crystals, Obninsk, Russia, September 21–26, 2003. W. Palosz.
122. Ring Current Ion Coupling With Electromagnetic Ion Cyclotron Waves, Advanced Research Workshop on the Effects of Space Weather on Technology Infrastructure, Rhodes, Greece, March 23–30, 2003. G.V. Khazanov.
123. The Rondonia Lightning Detection Network: Network Description, Science Objectives, Data Processing/Archival Methodology, and Results, International Conference on Atmospheric Electricity ICAE 2003, Versailles, France, June 9–14, 2003. R.J. Blakeslee, J.C. Bailey, O. Pinto, A. Athayde, N. Renno, and C.D. Weidman.
124. Science Issues Associated With the Use of a Microfluidic Chip Designed Specifically for Protein Crystallization, American Crystallographic Association (ACA) Covington, KY, July 26–31, 2003. A.M. Holmes, L. Monaco, C. Barnes, S. Spearing, A. Jenkins, T. Johnson, D. Mayer, and H. Cole.
125. SLMS™ Athermal Technology for UV and Cryogenic Applications, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. W.A. Goodman and M. Jacoby.
126. Sol-Gel Precursors for Ceramics From Minerals Simulating Soils From the Moon and Mars, 105th Annual Meeting of the American Ceramic Society, Nashville, TN, April 27–30, 2003. L. Sibille, J.A. Gavira-Gallardo, and D. Hourlier-Bahloul.
127. Solutal Convection Around Growing Protein Crystal and Diffusional Purification in Space, International Symposium on Physical Sciences in Space (ISPS), Toronto, Canada, May 4–8, 2003. A.A. Chernov and C.P. Lee.
128. Space Station Science Supported by Marshall Space Flight Center, American Institute of Aeronautics and Astronautics (AIAA) Seminar, Session IV/Space Station (*ISS*) Operations Technology and Future Space Science Plans, Huntsville, AL, March 15, 2003. A.F. Whitaker, P.A. Curreri, and T.R. Smith.
129. Spaceflight Holography Investigation in a Virtual Apparatus (SHIVA) Ground Experiments and Concepts for Flight Design, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. J.H. Micruik, J.D. Trolinger, J.D. Lackey, M.E. Milton, J. Waggoner, and R.D. Pope.

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130. Stability Analysis of Flow Induced by the Traveling Magnetic Field, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. K. Mazuruk.
131. Status Report and Lessons Learned From the University of Arizona UA NGST Mirror System Demonstrator, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. D. Baiocchi, and J. Burge.
132. Structural Basis for “Flip-Flop” Action of Human Pyruvate Dehydrogenase, American Crystallographic Association (ACA) Meeting, Cincinnati, OH, July 26–31, 2003. E. Ciszak, L.G. Korotchkina, P.M. Dominiak, S. Sidhu, and M.S. Patel.
133. Structural Basis for Flip-Flop Action of Thiamin Pyrophosphate-Dependent Enzymes Revealed by Human Pyruvate Dehydrogenase, Polish Chemical Society Meeting, Lublin, Poland, September 15–19, 2003. P.M. Dominiak, E.M. Ciszak, L.G. Korotchkina, S. Sidhu, and M.S. Patel.
134. Structural Health Monitoring of Composite Materials Using Distributed Fiber Bragg Sensors, 2002 OSA Annual Meeting and Exhibit/LS-XVIII, Orlando, FL, September 29–October 3, 2002. J. Grant, R. Kual, S. Taylor, K.V. Jackson, G. Myers, Y. Wang, and A. Sharma.
135. Structural Model for the Flip-Flop Action in Thiamin Pyrophosphate—Dependent Human Pyruvate Dehydrogenase, Gordon Research Conference, Meriden, NH, July 13–18, 2003. E.M. Ciszak and P.M. Dominiak.
136. Structure-Derived Proton-Transfer Mechanism for Action of Human Pyruvate Dehydrogenase, University of Plymouth, United Kingdom, August 26, 2003. E.M. Ciszak and P.M. Dominiak.
137. SUBSA and PFMI Transparent Furnace Systems Currently in Use in the *International Space Station* Microgravity Science Glovebox, 41st American Institute of Aeronautics and Astronautics (AIAA) Conference, Reno, NV, January 6–9, 2003. R.A. Spivey, S. Gilley, A. Ostrogorsky, R.N. Grugel, G. Smith, and P. Luz.
138. Synthesis of Sol-Gel Precursors for Ceramics From Lunar and Martian Soil Simulants, 55th Pacific Coast Regional and Basic Science Division Fall Meeting, Oakland, CA, October 19–22, 2003. L. Sibille, J.A. Gavira-Gallardo, and D. Hourlier-Bahloul.
139. A Tabletop Tool for Modeling Life Support Systems, Conference on Space Technologies, Colorado Springs, CO, November 4–6, 2003. N. Ramachandran, A. Majumdar, D. McDaniels, and E. Stewart.

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140. Thermal Property Measurement of Semiconductor Melt Using Modified Laser Flash Method, American Society of Mechanical Engineers, Las Vegas, NV, July 21–23, 2003. B. Lin, S. Zhu, H. Ban, C. Li, R.N. Scripa, C.-H. Su, and S.L. Lehoczky.
141. Through Microgravity and Towards the Stars: Microgravity and Strategic Research at Marshall's Biological and Physical Space Research Laboratory, Gordon Research Conference, New London, CT, July 26–August 1, 2003. P.A. Curreri.
142. A Total Lightning Climatology for the Tennessee Valley Region, International Conference on Atmospheric Electricity (ICAE) 2003, Versailles, France, June 9–14, 2003. E.W. McCaul, Jr., S.J. Goodman, D.E. Buechler, R.J. Blakeslee, H.J. Christian, D.J. Boccippio, W.J. Koshak, J.C. Bailey, J.M. Hall, M. Bateman, W.A. Petersen, C. Darden, and T. Bradshaw.
143. Towards the Structure Determination of a Modulated Protein Crystal: The Semicrystalline State of Profilin: Actin, American Crystallographic Association (ACA) Meeting, Covington, KY, July 26–31, 2003. G. Borgstahl, J. Lovelace, E.H. Snell, and H. Bellamy.
144. Traveling Magnetic Field Applications for Vertical Bridgman Growth: Modeling and Experiment, 15th American Conference on Crystal Growth and Epitaxy (ACCGE), Keystone, CO, July 20–24, 2003. K. Mazuruk.
145. Two Strategies for Microbial Production of an Industrial Enzyme—Alpha-Amylase, Poster Presentation at Student Research Day, The University of Alabama in Huntsville, Huntsville, AL, April 11, 2003. E.C.M.J. Bernhardsdotter, O.K. Garriott, M.L. Pusey, and J.D. Ng.
146. UAH Instrument for Measuring Cryo CTE, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. C.S. Vikram and J.B. Hadaway.
147. Ultra-Lightweight Borosilicate Gas-Fusion Mirror for Cryogenic Testing, Technology Days 2003, SD70 Web Site, Marshall Space Flight Center, Huntsville, AL, September 16–18, 2003. M. Voevodsky.
148. Use of MODIS Land and Sea Surface Temperatures To Initialize Mesoscale Models, AMS Conference 83rd Annual Meeting of the American Meteorological Society, Long Beach, CA, February, 9–13, 2003. W.M. Lapenta, S. Haines, G.J. Jedlovec, and S. Mackaro.
149. Use of MODIS/AIRS Direct Broadcast Data for Short Term Weather Forecasting, EOS Direct Broadcast Users Conference, Kohala Coast, HI, November 17–20, 2003. G.J. Jedlovec.
150. Use of Satellite Data Assimilation To Infer Land Surface Thermal Inertia, AMS Conference 83rd Annual Meeting of the American Meteorological Society, Long Beach, CA, February, 9–13, 2003. W.M. Lapenta, R.T. McNider, A. Biazar, R.J. Suggs, G.J. Jedlovec, and S. Dembek.

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151. Using Strong Magnetic Fields To Control Solutal Convection, Microgravity Transport Processes in Fluid, Thermal, Biological, and Materials Sciences Conference III, Davos, Switzerland, September 14–19, 2003. N. Ramachandran and F.W. Leslie.
152. Using the Chandra Project To Communicate With Underdeveloped Constituencies, Meeting on Communicating Astronomy to the Public, Washington, DC, October 1–3, 2003. M.L. Adams, R.F. Elsner, C. Kouveliotou, S.K. Patel, R.D. Preece, C. Strong, C.A. Wilson, and P.M. Woods.
153. When Earth Songs Filled the Void of Space, Annual Meeting of the Tennessee Association of American Physics Teachers, Clarksville, TN, March 28, 2003. D.L. Gallagher.
154. Wide-Angle Optical Telescope for the EUSO Experiments, 28th International Cosmic Ray Conference, Tsukuba, Japan, July 31–August 7, 2003. L.W. Killman, Y. Takahashi, A. Zuccaro, D. Lamb, K. Pitalo, A. Lopada, and A. Keys.

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